

UNCONFINED COMPRESSION TEST ON ROCK

1. SCOPE: This method describes the procedures employed in preparing and testing rock core specimens with diameters of approximately 2 in. to determine their Unconfined Compressive Strength.
2. Refer to *Standard Practice For Preparing Rock Core Specimens And Determining Dimensional And Shape Tolerances - Astm D 4543-85* with the following modifications:

5.1 to 5.5 may be omitted if specimens meet the following shape tolerances:

Each surface of the specimens shall be plane within 0.25 in., i.e. there shall be no depressions or protrusions in the surface that are greater than 0.25 in. Neither end of the specimens shall depart from perpendicularity by more than 0.05 in. in 2 in. or 2.5 parts in 100. The difference between the maximum and minimum specimen diameters shall not exceed 0.1 in.

5.7 to 5.8.1: Specimens may be capped with unbonded caps meeting the requirements of ASTM C 1231 (6.2 & 6.3) except that the retainers shall have inside diameters of 2.20 ± 0.05 in. Qualification tests are not necessary to establish the maximum and minimum strength levels appropriate for use with pads of a given Shore A durometer hardness of pads; Shore A durometer hardnesses of 50 to 70 are recommended.

5.9: After compression testing, the moisture content shall be determined using the suggested method or by testing the entire specimen according to AASHTO T 265.

6.1 to 6.1.4: May be omitted if the information is presented in other project records.

6.1.5 to 6.1.5.3: Verification that the specimen meets the specified shape tolerances may be reported.

6.1.6: May be omitted if the information is presented in other project records.

3. Refer to *Standard Method Of Test For Unconfined Compressive Strength Of Intact Rock Core Specimens - Astm D 2938 - 86* with the following modifications:

4.1: Specimens may be prepared according to the procedures above.

4.2: Add the following: Specimens shall be wrapped or otherwise preserved in the field to prevent loss of moisture.

- 5: If specimens are capped with unbonded caps add the following:

Specimens shall be air dry on the surface immediately prior to testing to avoid the possibility of allowing moisture to get between the pads and retainers and then rusting.

Each pad shall have a light coat of talcum powder on the bearing surface prior to testing a specimen.

During testing, there shall be no loose particles of soil, dust, etc. trapped in the following locations: between the pads and the retainers; between the specimen and the pads; between the retainers and the bearing blocks of the testing machine.

Place a cap on the top and bottom surface of the specimen. With the caps in contact with the specimen, carefully align the axis of the specimen with the center of thrust of the spherically seated block. Bring the bearing blocks of the machine in contact with both of the caps.

7.1.1 to 7.1.3: May be omitted if the information is presented in other project records.

7.1.5: Alternatively, the time to failure may be reported.

7.1.6: After compression testing, the moisture content shall be determined using the method suggested in ASTM D 4543-85 (5.9) or by testing the entire specimen according to AASHTO T 265.

7.1.7: The unconfined compressive strength of each sample tested shall be reported. Any statistical analyses of the data shall be part of the engineering analyses.

Note 3: If (L/D) is less than 2.0, the Unconfined Compressive Strength may be calculated as follows:

$$q_u = \alpha \left(\frac{\text{Max. Load}}{\text{Area}} \right), \quad \text{where } \alpha = \left(\frac{1}{0.88 + \frac{0.24}{(L/D)}} \right)$$

APPROVED _____
Director
Division of Materials

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